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A HERMIT THRUSH STUDY.

BY NORMAN MC CLINTOCK.

SOME forty miles northwest of Marquette, Mich., on the south shore of Lake Superior, are situated the Huron Mountains of granitic formation. Here are also found several wild and beautiful inland lakes. The drainage of two of these, Pine Lake and Mountain Lake, forms Pine River, the entire length of which, before it empties into Lake Superior, is only about one and one half miles. Three quarters of a mile from this river's outlet a Hermit Thrush's nest containing four eggs was found by a boy, upon July 24, 1907. The nest was built upon the sloping river bank, fifteen feet from the water's edge, and with a southwestern exposure. At an equal distance on another side of the nest was a swamp overgrown with a thicket of alders, which bushes also lined the river bank. The nest was placed on the ground beneath a low huckleberry bush, the latter being overspread by the pendant fronds of a fern brake. The surrounding vegetation of the immediate vicinity consisted of little white pine seedlings, huckleberry bushes, brakes, wintergreen plants and trailing arbutus. The region was also wooded, the trees consisting almost entirely of pines — Norway, white and jack.

Three days after the discovery of the nest, it was visited again, when two of the eggs were hatched. On the day following, July 28, there was a third young bird. The fourth egg proved to be addled.

It was not until August 2 that I was able to begin the following observations, which were made from a dark green denim blind, supported by an umbrella, according to Mr. F. M. Chapman's specifications.

From this blind I also secured a series of interesting photographs, several of which were published in 'The Outlook' of April 23, 1910, together with a short account of my Hermit Thrush study.

Nest Construction.

The nest was entirely composed of the materials with which the ground, surrounding the site, was thickly strewn; namely, dead Norway and white pine needles, green moss, decayed wood and dead twigs. Although there were jack pines within a few feet of the nest, no needles of this species were used. For the inside lining of the nest, the finer white pine needles were exclusively employed. The green moss was worked into the downward sloping wall of the nest, but was not found in the rear wall. The decayed wood was worked into both the rear and front walls. The only other material gathered by the thrushes were a few dead twigs, which were promiscuously scattered over the other materials of which the nest was constructed.

I wish to offer here what seems to me a probable and satisfactory explanation why the color of the Hermit's tail is lighter than the rest of its upper parts. In my observations, I noted that the small bits of decayed pine wood, which were scattered about the ground, were of a conspicuously lighter tone than the brown of the predominating pine needles and other dead leaves. Not only this, but when the sun shone, spots of sunlight filtered through the trees and undergrowth, lighting up patches of brown upon the ground. The color of the Hermit's tail had just the effect of the small pieces of dead wood and of the sunlit spots mentioned. It was very evident that these thrushes were, at least in that locality, better protected by the lighter color of the tail than if the latter were uniform in color with the back and wings, as in the Olive-backed Thrush.

Feeding.

It was half an hour after I entered my blind on August 2, before the young were fed, which was done by both parents. During the first hour, there were but three feedings and during the succeeding one and one half hours six feedings more. Sometimes twenty minutes elapsed between feedings, at other times but a moment. The average interval during my two and one half hours watching on this first day was sixteen and three quarters

minutes. This was undoubtedly much longer than normal and was due to the timidity of the birds, by reason of my blind. The parents were frightened away a number of times when approaching with food, but on the succeeding days were less timid, especially the female.

Twice on August 2, a parent visited the nest without the intention of feeding, a general inspection apparently being the sole object. On the two occasions on August 2, I thought feeding was accomplished by regurgitation, but at no succeeding time was there any semblance of this method.

It would have been much better could I have left my blind in position at the nest during my absence. However, to guard against the molestation of the nest, I deemed it advisable to remove the blind each day.

On August 3, I watched for three hours and twenty-two minutes, beginning at 12:10 P. M. The first feeding was given in eight minutes after entering my blind. On this day forty-three feedings were administered, which is an average of four and three quarters minutes between feedings.

Out of thirteen of these feedings, the parents on four occasions divided food carried at one time between two young, while each of the remaining nine feedings were administered to but a single bird. Not once, either on this or any other day, did I see three young fed at the same time.

On August 4, I watched from 11:38 A. M. until 1:07 P. M. During this period twenty feedings were given, which is an average of once in $4\frac{1}{2}$ minutes.

Three hours and twenty-five minutes were spent by me, between 11:50 A. M. and 3:15 P. M. on August 5, in my blind. But twenty-eight feedings were administered on this date; which was one feeding in $7\frac{1}{3}$ minutes.

During the first couple of days of my observations, I could only occasionally distinguish between the sexes of the parents. I later observed, however, that the spots on the breast of the male, which I positively distinguished by his singing, were slightly more intense and more sharply defined than on the female. On August 5, out of eight feedings, when I was sure of the parents' sex, six were administered by the male.

Many times it was impossible to detect the kind of food given to the young. I noted the following facts regarding this question: On August 3, a grasshopper was fed to the young on two occasions, and in both instances, the insect was divided between two nestlings. Twice a brown moth was fed to a single bird. That at least one of these moths was fed intact was demonstrated when the parent, in the act of transferring it to the young's mouth, dropped the moth within the nest, about which it fluttered until recaptured. On two occasions green caterpillars were given; at other times bunches of indistinguishable insects. This animal diet was occasionally varied by red wintergreen berries, which I saw given three times on August 3.

All food was, apparently, gathered within a very short radius of the nest, the parents, I should say, seldom being more than fifty feet distant.

Sanitation.

During my watch of three hours and twenty-two minutes on August 3, the young made their excrement ten times, which is approximately one fifth of the number of individual feedings. On August 4, four excrements were made in one and one half hours, which was also about one fifth of the feedings. On August 5, however, this ratio increased to one third, when there were ten excrements to about thirty feedings, during three hours and twenty-five minutes.

No nestling ever made its excrement, except immediately after being fed. After a parent had delivered food, it would remain for a few seconds by the nest to see whether a little bird showed a desire to make its excrement. If it indicated this desire, the parent with head lowered stood behind the nestling and received the excrement in its bill, before the former fell. To facilitate the handling of the excrement by the parents, the young generally bowed their bodies in the shape of a U, which brought both the head and the vent on a level with the rim of the nest. Twice, however, instead of assuming this position, I saw a nestling apparently stand on its head when voiding its excrement. Three times, during my days of watching, a parent was frightened away before

it could secure the excrement. Twice this lodged on the nest rim and once it dropped back into the nest. On the three occasions mentioned, each excrement was immediately removed upon the parent's succeeding visit.

Up to about noon on August 3, the excrements were, with one exception on August 2, swallowed by the parents; after this date, however, they were invariably carried away between the mandibles.

While the young lived within the nest, I observed that the excrement was enclosed within a gelatinous sac. I subsequently learned, upon the day after the young left the nest when one of the little birds voided its excrement in my presence, that the excrement lacked the gelatinous sac.

Call Notes.

A very interesting and instructive part of my experience with this thrush family was what I heard and learned relative to the birds' call notes, of which I distinguished five distinct kinds, in addition to the song of the male.

The first of these was the well known *quirk* or *quoit*, which is familiar to all acquainted with this species. This note was seemingly employed as a mild form of protest and was uttered when the birds were slightly suspicious or when they mildly protested against the presence of an intruder. A second note was a high pitched, thin and wiry call that was a counterpart of the Cedar-bird note. It was also I think, judging from memory, even more like a similar note that is much used by the Robin. This latter comparison is of special interest owing to the ancestral relationship existing between thrushes and robins.

I was one day fortunate in hearing a Cedar-bird and one of the parent Hermits give these similar notes at the same time and within a few feet of each other. The Hermits' note, although of the same quality as that of the Cedar-bird was pitched several tones higher than that of the latter. The Hermits used this thin wiry note as a warning to the young of approaching danger. To the little birds this call meant "freeze." On the last day of my observations, I had two good opportunities of witnessing the use of the call note in question. On one occasion both parents were

out of sight and the young were uneasily testing their growing strength by moving about the nest, spreading their wings, stretching their legs and opening wide their mouths. Suddenly, from the adjacent swamp, came this wiry note of warning. Instantly, the three young closed their conspicuous yellow lined mouths, dropped to the bottom of the nest and remained motionless. Later that day I again saw the same thing repeated.

A third note, which this pair of Hermits used signified extreme distress. This note sounded to me much like the note of a hoarse Canary. I can best describe it by the word *boyb*, spoken slowly and with a rising inflection. The note also reminded me of the mew of a kitten. *Boyb* was uttered by the thrushes with the mandibles well open, whereas their Cedar-bird call was made with the mandibles almost closed.

Besides the three notes described, there was a much used conversational note that evidently contained no implication of suspicion or trouble and was in strong contrast with the several notes already described. It was an exceedingly soft and sweet little note that could be heard but a few feet, and which I can best describe by *wee*. *Wee* was used by the parents to each other and to the young. It seemed, however, to be mostly employed to herald to the young the parents' approach with food. At a distance of six or eight feet from the nest a single *wee* from a parent would announce to the young the former's proximity. As the parent hopped closer, the *wees* were rapidly repeated, *wee-wee-wee-wee*, and the nearer the parent came to the nest, the softer the *wees* were uttered, until they were faint whispers. To these *wees*, the young responded, during their first days, by erecting their heads and opening wide their mouths; but later, when they became more mature, they would rise to their feet upon hearing the first *wee* and energetically beg for food. *Wees*, however, were not always uttered when the parents approached the nest. Sometimes, when everything seemed to be running smoothly, the parents came and went in complete silence.

The fifth, and only remaining note, was one I heard but twice and both times it came from the male. It was an indescribable explosive twitter of ecstasy made with fluttering wings. I first heard it on August 3, immediately after the male had been singing

for four minutes. On another day, it was uttered in the presence of the female, who was close by and towards whom it was directed.

Singing.

Each day I was at the nest, the male Hermit sang. A particular limb in a dead pine, fifteen feet distant, was the favorite perch for his exquisite performances. The first time I heard him from this limb, I thought it was another bird far back in the woods. With the assistance, however, of a pair of 8-power prism binoculars, which brought the Hermit within an apparent distance of about two feet, I could plainly see the feathers of his throat vibrate coincidentally with the singing. There was little if any movement of the mandibles and the notes were muffled or hummed, instead of being poured forth from well opened mandibles in a volume that carries far. I believe this explains the remarkable and well known power as a ventriloquist of the male Hermit, by whom I was deceived, even when looking directly at the singer in a good light and fifteen feet distant.

The male Hermit sang daily until August 7, when my observations ceased, and it sang during all hours of my presence. These song periods varied from a few seconds to six minutes duration, and this longest period was at noon on August 4. Almost all the singing was, however, so low and soft that it could be heard only at close range.

Development of Young.

The little Hermits were 6 or 7 days old on August 2, when I commenced my observations. They then kept their eyes closed almost constantly and seldom moved, except while being fed or during the few seconds immediately following feeding, when they would move their bodies, stretch their wings and then settle quietly down. At this age the young seemed occasionally to tire of their customary sitting posture and once on August 2 I saw one young bird rest on its side with one foot in the air, as high as the heads of the other little birds. On this same day, I also noticed one young picking at his half grown pin feathers. Towards evening

on August 2 it commenced to rain, but the rain did not last long and no brooding of the young was done. Several times during each bright day, the sun shone directly on the nest. During these periods, some of which lasted twenty minutes or more, the young seemed to suffer. Twice on August 2 the female brooded, once for eight minutes, but the latter was the last brooding I observed. Preceding each of the broodings mentioned, the female straddled the nest and seemed to burrow between the young. The explanation of this action I was unable to definitely discover. Possibly, however, the bird may have been loosening the packed down pine needles lining the nest bottom, in order to secure better air circulation. Throughout the eight minutes of brooding by the female, the male sat on his favorite perch in the dead pine, with food for the young in his bill.

The young were 8 or 9 days old on August 4 and showed marked development over the day before. When I approached the nest the little fellows hissed at me. During the parents' absence, the nestlings also kept their eyes open much of the time, whereas, on the day before, they kept them closed. They also exhibited considerable activity on the 4th, picking their feathers and stretching their wings. On this day, I also noticed that the young for the first time rested their heads on the rim of the nest.

On the day following, August 5, the dark tips of the feathers forming the spots on the breast and the little bright cinnamon tail feathers showed very plainly. I also observed, for the first time, one of the young erecting his crown feathers. Two of the young also stood on their legs in the nest and stretched their wings, one flapping his wings.

Heretofore, the young, while in repose or sleeping, during their parents' absence, kept their heads straight in front, but on August 5 I saw one young bird rest its head on or behind its wing while sleeping.

August 6 was hot and sultry with a south wind. On this day, the young clamored for food by squeaking, when the parents approached within six or eight feet of the nest, and, as they came nearer, the little fellows rose to their feet and with necks craned forward, received their rations. The attitude of the parents toward the young likewise changed on this day, for, instead of

hopping along the ground for the last six or eight feet, when approaching the nest, as was invariably done during the first days, they now flew direct to the nest.

I was much interested in watching the attitude of the parent Hermits towards other animal life during my period of watching. A neighboring chipmunk was chased daily and upon one occasion was put to rout three times within ten minutes. No attention by the Hermits was paid to the proximity of Chickadees or a Purple Finch. Neither at another time did one of the parents, which I was watching at the nest, exhibit any apparent concern, when a Northern Raven flew low over the nesting site.

The greatest exhibition of anxiety made by the Hermits toward any wild creature, during my entire watching, was on August 6 when there was much excitement, which lasted for a half hour, in the thicket just back of my blind. During this time, all feeding by the parents was suspended and the thrushes constantly uttered their several alarm notes, changing from one to the other at intervals. In these protestations the thrushes were joined by a sympathetic flock of Chickadees. An investigation by me of the source of the trouble disclosed, to my surprise, a Flicker leisurely feeding on the ground.

Towards evening of August 6 it was apparent to me that the time for the young to leave the nest was close at hand. I, accordingly, decided to secure, before it was too late, some portraits of the young that would show their development. This process brought to a close the life in the nest, as the young birds would not remain in their nest after being temporarily removed.

The next morning when I returned I found the site deserted, and even though I took up my watch within the blind, yet no sight nor sound of any Hermit did I have. I later located one young thrush in the following manner, which I believe would prove an excellent method for others to adopt when desirous of finding hidden nests or young birds: I hunted around in the adjacent swamp until I heard the familiar Canary-like *boyb* note of a parent Hermit. This note was kept up until I retreated from the spot, when the male changed from the *boyb* note to his Cedar-bird like call. This indicated to me that I was very near the young. Accordingly, procuring my blind, I hastened to the spot where I

heard the distress calls, which was about 100 feet from the nest, and there went into hiding. At the time there were three adult hermits together. After ten minutes silence, I began to hear occasional faint little "peeps," which it was impossible to locate precisely. Presently, however, one of the little thrushes appeared from hiding and began to hop along the ground and fallen logs and to climb through the underbrush. Now and then the little fellow would fly two or three feet, from twig to twig, all the while pumping up and down his little cinnamon tail, so characteristic of all adult Hermits, and giving voice to an occasional "peep" for food. But when it received food from a parent, no sound was uttered by the young bird, neither did the parents use the *wee* note. Though I made a search of the vicinity the following morning, August 8, I could find no trace of the Hermit family.

WILD LIFE OF AN ALKALINE LAKE.

BY FLORENCE MERRIAM BAILEY.

THE few lakes of the arid region are peculiarly interesting as they attract hordes of migrating water birds that pass over the wide stretches of dry land, while affording nesting sites for many resident water birds, and feeding grounds for both birds and beasts of prey. A series of alkaline lakes in northern New Mexico near the continental divide was once visited by us during a fall migration and although we were unable to take a census of the water-fowl gathered there we had a most interesting experience.

The largest and most thickly populated of the lakes had been named from a sulphur spring with frank, western realism — Stinking Spring Lakes. From long and bitter experience with alkali we took warning from the name and stopped before reaching them to fill our canteens and water keg at a spring of less noisome reputation, where we found a like-minded Mexican boy with three burros, filling his kegs for a sheep camp.

The first lake on the road, reached just at sundown, suggested